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FAUNAL REMAINS FROM TWO SITES AT MAKETU, BAY OF PLENTY

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Introduction

In his recently published book *Hostile Shores* Bruce McFadgen (2007) draws attention to the scarcity of recorded early (Archaic) sites in the Bay of Plenty, especially at river mouths and harbour entrances, and largely attributes that to the impact of a regional tsunami event pre-1630 AD. He also notes the rarity of moa and other bird bones in Archaic sites, which he considered is probably directly attributable to the Kaharoa eruption around 1315 AD. McFadgen (2007: 176) concluded it was likely "that a large part of the central Bay of Plenty, particularly around Maketu and for some kilometres east and west, would have been a desolate landscape when the first settlers arrived" and that "only at sites on the periphery of the [Kaharoa] tephra layer, at Ohiwa Harbour and along the Coromandel Peninsula, are there moa bones from hunted birds".

Law (2008) has also commented on the limited evidence for early occupation of the Bay of Plenty and, like McFadgen, suggests that may have been partly due to the Kaharoa eruption, which would have caused high sediment loads and acidity of many rivers and made the landscape unappealing for cultivation.

In March and April 2007 a new water main was laid along Beach Road, Maketu for the Western Bay of Plenty District Council by a combination of open trenching and lateral drilling, at an average depth of about 1 m below road level. During monitoring of this work two previously unrecorded archaeological sites were identified, one at the southern end of Beach Road (V14/187), the other along the northern part (V14/188) (Figure 1). The former is undoubtedly

an early site, containing evidence of stone tool manufacture and abundant moa bone. The other site is much younger and consists of an extensive midden layer with a considerable amount of fish bone. The faunal content of the two sites is very different and demonstrates a significant change in economy over time.

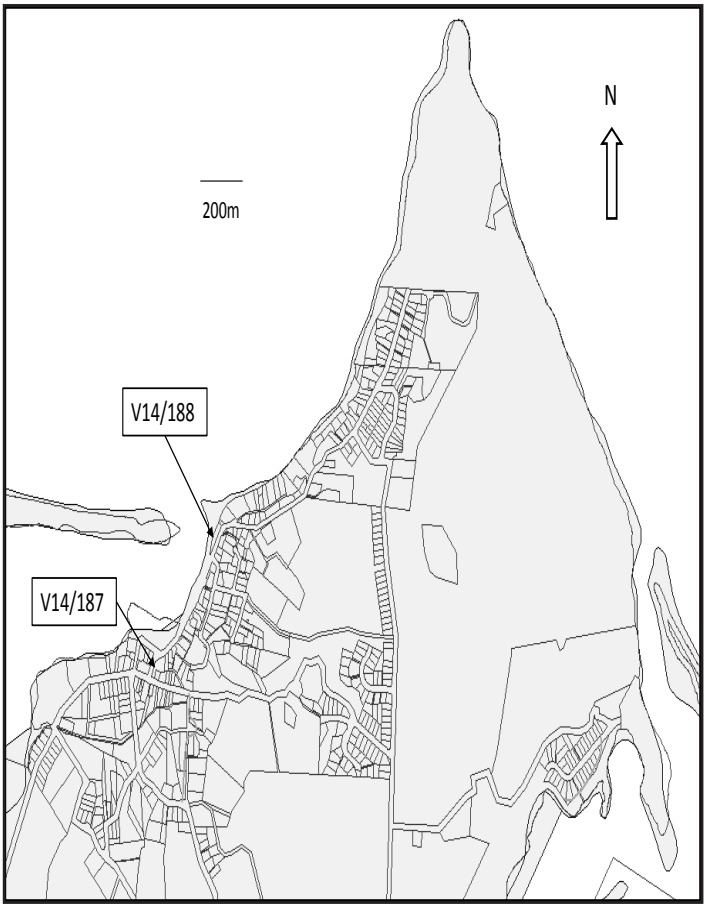

Figure 1.Map of the Maketu penninsula, showing the location of sites V14/187 and V14/188.

This paper provides a brief account of the faunal material recovered from the two sites; more detailed information is provided in Moore (2008). The

mammal bone was identified by Graeme Taylor, bird bone by Graeme Taylor and Brian Gill, and the fish bone by Tiffany James-Lee.

Description

Site V14/187

This site is located on the corner of Beach Road and Little Waihi Road, directly opposite the Maketu pie factory (Figure 1). The area is currently used as an informal parking area by the factory employees. The site has a minimum lateral extent, along Beach Road, of about 40 m, and is estimated to cover an area of approx. 50 x 30 m. Only about 10-12 m^2, or perhaps < 1% of the site, was affected by trenching for the water main.

The site consists of a distinctive (lower) cultural layer of black, charcoal-rich sand containing abundant stone flakes, oven stones and bone material. In the southern part of the site this directly overlies the Kaharoa Tephra, which is 10-15 cm thick at this location and grades down into clean white sand. There is no indication of soil development on top of the Kaharoa ash. The lower or main cultural layer is overlain by clean sand, and above it is an upper cultural layer of dark sand with charcoal and some shell. The base of the cultural sequence lies between 50 cm and 1 m below the present ground level. In places it has been disturbed or truncated by the later excavation of rubbish pits containing late nineteenth-early twentieth century bottles and other European domestic material.

Several structural features were recorded at the base of the main cultural layer. These had been excavated into or through the Kaharoa tephra, and included a small pit filled with oven stones and large moa bones, two firescoops, and some postholes.

Faunal material recovered from the main cultural layer consisted of moa and other bird bone, dog bones and sea mammal bones. There was a large quantity of moa bone, mostly pieces scattered throughout the layer, but several near-complete leg bones were also collected. Apart from two vertebrae, all of the identifiable material was leg bone. By weight, moa bone made up 83% of the entire assemblage.

The moa bones identifiable to species are from a minimum of three individuals. At least two individuals were North Island giant moa *Dinornis novaezealandiae*, one a female (Figure 2) and the other an immature female or male. Another bone was from the small coastal moa *Euryapteryx curtus* (Figure 3). In addition, there were several fragments which on size alone must be from *D. novaezealandiae*, some other robust pieces of femur either from *Dinornis* or the stout-legged moa *Euryapteryx gravis*, and one fragment that

could be from *Eu. curtus* or Mappin's moa *Pachyornis geranoides*. A proportion of the moa bone was burnt (8% by weight), and some showed clear evidence of having been gnawed by dogs and/or rats. There was no indication that any of the bone had been worked.

Figure 2. Right femur of the New Zealand giant moa Dinornis novaezealandiae *(femur). Photo: Tim Mackrell.*

Some bones from other bird species were also recovered, most unidentifiable to species. One fragment of carpometacarpus was attributed to the black swan *Cygnus atratus*. Swan bones found in archaeological sites used to be assigned to an endemic species, but it is now clear that black swans were a native species that became extinct in New Zealand during the prehistoric period (Worthy 1998).

A few mammal bones were identified, mostly those of dog. Based on the number of left humeri a minimum of two individuals are represented, although considering the distance over which dog bones were found (>20 m), there were

probably at least four individuals. Some of the bone had been gnawed (by dogs), but none had been worked. There were also a few sea mammal bones and teeth. The teeth are too large for fur seal and are most likely from a sea lion (Ian Smith, pers. comm.). One bone is probably from an adult sea lion, and a broken rib bone possibly from a fur seal.

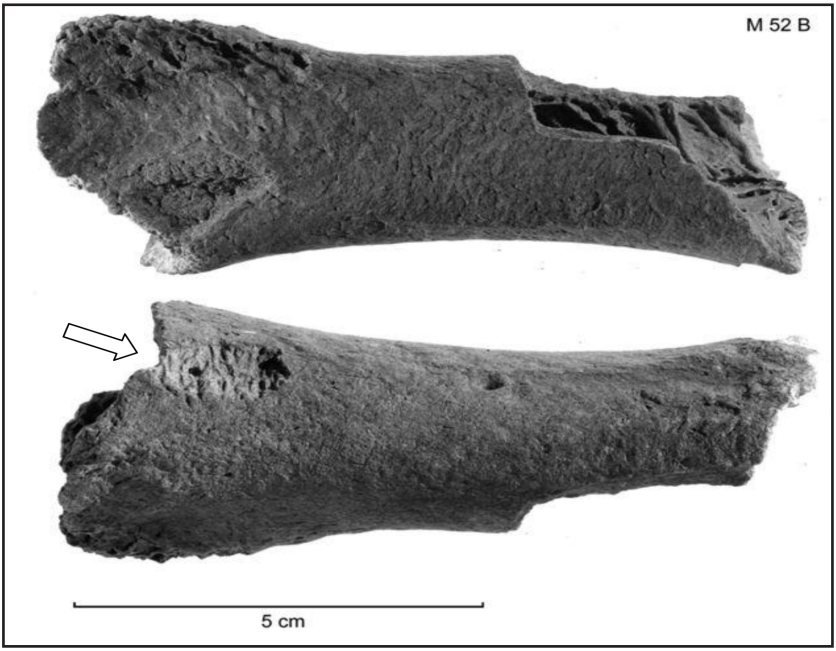

Figure 3. Left femur shaft of the small coastal moa Euryapteryx curtus *showing rat gnawing (arrowed), Photo: Tim Mackrell.*

Interestingly, there was no shell and remarkably little fish bone in the main cultural layer. Only one fish bone was able to be identified, and that was from a golden snapper.

Site V14/188

This site extends along the northern part of Beach Road and western end of Town Point Road for a distance of at least 140 m, and possibly up to 200 m (Figure 1). It is probably more than 10 m wide. The site consists of a single continuous midden layer up to 70 cm thick, situated 0.5-1 m below road/ground level and composed mainly of pipi shell with fish bone, oven stones, charcoal and some mammal bones. The midden overlies beach sand and, locally, yellow

brown sandy soil, at a depth of > 1m, and is overlain by clean dune sand. In places this is overlain by an upper layer of dark shelly sand with charcoal and oven stones. The midden is situated directly below a significant pa (V14/28), and it is quite likely that it was formed by those who occupied the pa.

The faunal content of this midden is in complete contrast to site V14/187. Shell is abundant, with pipi being the dominant species. Cockle, tuatua and ostrich foot (*Struthiolaria papulosa*) are relatively common, but other shellfish species collectively form <3% (numerically) of the midden, and only trough shell (*Mactra discors*), mussel and cat's eye (*Turbo smaragdus*) are represented in any significant number. Overall it is estimated that >70% of the shellfish was obtained from the adjacent estuary and about 30% from the ocean beach (sandy shore). Less than 1% was obtained from a rocky shore environment, probably only mussel and *Turbo*. Somewhat surprisingly, there is no evidence for the exploitation of paua.

Eighteen samples of fish bone from various parts of the midden layer were examined, and more than 2700 bones counted. The number of individual fish was 33, representing at least nine different species (Table 1). Mackerel spp. were the most common (52%), followed by kahawai (15%), and red gurnard, barracouta, john dory and sole/flounder (all 6%). One unusual species identified was the frostfish *Lepidopus caudatus* (1 individual).

Family	**Species**	**Common name**	**NISP**	**MNE**	**MNI**	**MNI%**
Carangidae	Carangidae species	mackerels	188	186	17	52%
Arripidae	Arripis trutta	kahawai	17	17	5	15%
Trigilidae	*Chelidonichthys kumu*	red gurnard	17	10	2	6%
Gemplyidae	*Thyrsites atun*	barracouta	8	8	2	6%
Zeidae	*Zeus faber*	john dory	6	6	2	6%
Pleuronectidae	Pleuronectidae species	sole/flounder	3	3	2	6%
Sparidae	*Pagrus auratus*	snapper	9	4	1	3%
Cheilodactylidae	*Nemadactylus macropterus*	tarakihi	3	3	1	3%
Gemplyidae	*Lepidopus caudatus*	frostfish	1	1	1	3%
		fish species	2456	651	0	0%
TOTAL			2708	889	33	**100%**

Table 1. Indentification of fish bones from site V14/188.

Almost all of the mammal bone recovered from this site was either dog or human. The human bone was from a minimum of three individuals, all adults, and mainly from the leg and foot. Some showed cut marks, and one had clearly been gnawed by a dog. The human bones were scattered throughout the midden, and do not represent formal burials.

Dog bones were found at three locations, and these were associated with human bones at two of them. At least two individual dogs are represented. One was a very small immature dog, the other a mature but small-bodied animal. The former consisted of an almost complete skeleton, probably that of a recently born pup.

Other bone collected from this site included a possible bird ulna, and one fragment of very dense bone which might have been part of a whale mandible. There was also one fragment of unidentified bone which seemed to have been sharpened into a point, but apart from that there was no indication of the working of bone.

Dating

Three radiocarbon dates were obtained, one for site V14/187 (by AMS) and two for site V14/188. Details are provided in Table 2.

Site/Lab no.	Material	Conventional age	Calibrated age
Site V14/187 Wk 23623	moa bone	609 +/- 30 BP	68% prob. 1320-1415 AD 95% prob. 1310-1430 AD
Site V14/188 Wk 23624	pipi	826 +/- 35 BP	68% prob. 1435-1535 AD 95% prob. 1400-1630 AD
Wk 23625	pipi	731 +/- 35 BP	68% prob. 1510-1640 AD 95% prob. 1460-1680 AD

Table 2. Radiocarbon dates.

Calibration of the moa bone date for V14/187 unfortunately provides two possible ages: about 1320-1350 AD and 1380-1430 AD, but there is a 95% probability that the actual age lies somewhere between 1310 and 1430 AD. This is compatible with the known age of the Kaharoa Tephra which has been reliably dated to 1315 +/- 12 AD (Hogg et al. 2003), and the fact that the lower cultural layer directly overlies the tephra with no intervening soil horizon (although that could have been removed). Hence occupation of site V14/187 as early as 1320-1350 AD is certainly possible.

The two shell samples from V14/188 were both collected from the main midden layer and should have a fairly similar age. Although the conventional

radiocarbon ages are quite different, at 95% probability there is no significant difference between them, and overlap of the two age ranges indicates that the true age of the site probably lies between 1460 and 1630 AD. At 68% probability the overlap between the two dates is quite small, and suggests the midden could have been formed in the sixteenth century.

Although the dates suggest there may be as little as 30 years, or perhaps up to 200 years, difference in the age of the two sites, considering the differences in faunal content and also the charcoal assemblages, a gap of at least 50-100 years seems probable. Site V14/188, therefore, is very unlikely to be older than about 1450 AD.

Discussion

The discovery of site V14/187 fills an obvious gap in the distribution of known Archaic sites in the Bay of Plenty, between those at Mt. Maunganui and Ohiwa Harbour (see Law 2008: 41). The position of the site is a typical location for early sites i.e. just inside a harbour entrance and close to the shoreline. Although it is currently situated about 180 m from the Maketu estuary, the intervening area is mostly reclaimed land and in the 1930s the shoreline was apparently only 20 m or so from the site (Kahotea 1997).

The site provides the first definite evidence for early occupation of the Maketu area, though artefact finds had previously indicated that was very likely (Moore 1981). Just how early remains uncertain, but around 1330-1350 is certainly possible, which would be in good agreement with the date of circa 1340 AD that the Arawa canoe is thought to have arrived at Maketu (Tapsell 1940). However, occupation in the late 1300s – early 1400s is also possible.

Faunal remains indicate that moa, other birds, dogs and occasional sea lions and fur seals formed a major part of the diet. From the type of moa bones it is evident that carcasses were butchered elsewhere, and mostly only legs were cooked and consumed at this location. Whether this means the birds were killed some distance away, or there was such an abundance of moa that only the legs were considered worth eating, is unclear. There is certainly no indication that leg bones were required for the manufacture of fish hooks, and it seems that many of the bones may have been smashed up simply to get at the marrow. Working of bone on another part of the site, however, cannot be ruled out.

It is possible that moa were obtained as far away as Coromandel Peninsula or the eastern Bay of Plenty as proposed by McFadgen (2007), because the artefact assemblage does indicate a close connection with the former area as well as procurement of some lithic materials from the east. This assumes, however, that the central Bay of Plenty area, particularly around Maketu, was a "desolate landscape when the first settlers arrived" (McFadgen 2007: 176), and

therefore could not have supported local moa populations. While the Kaharoa tephra would undoubtedly have caused considerable damage to the forest, and is 15-20 cm thick in the Maketu area (Cotching 1988, cf. McFadgen 2007), identification of charcoal from site V14/187 indicates there were at least some pockets of forest in the vicinity, consisting of pohutukawa, matai, kahikatea, maire and also smaller broadleaf trees such as ramarama, ngaio and fivefinger. Although some of the charcoal could have come from the burning of driftwood, it is notable that none is from small shrub species, which would be expected to be among the first plants (along with bracken) to re-colonise an ash-covered landscape. Perhaps this might indicate that site V14/187 was not occupied until 40-50 years after the Kaharoa eruption. Interestingly, Tapsell (1940) states that at the time of initial settlement circa 1340 AD the Maketu headland was possibly only partly covered in bush, enabling the hillsides to be easily cleared for the cultivation of kumara and taro.

Fishing was obviously an important activity of those who formed the midden at site V14/188. Since there is no evidence of fish hook manufacture at this site either, much of the fish was presumably caught using nets, traps or spears. The range of species identified, however, does not necessarily support that idea. Although mackerel were apparently caught with nets, kahawai and barracouta are usually obtained by trolling, and snapper by line fishing, and if nets and traps were used to any extent within the estuary or close to shore, the range of species and relative abundances should reflect that. Murray (1978) records that the main species found in the estuary at present are mainly long finned eels, flounder, kahawai, mullet, parore, stargazers and rockfish, yet of those only kahawai is represented in any significant number in the fish bone analysis. It is particularly notable that no eel bones were identified.

In terms of seasonality, blue mackerel are more common in the summer months (October-February, Leach 2006), and barracouta is mainly caught in the Bay of Plenty between June and September. John Dory are not often hooked, but in winter apparently move into shallow water where they could be more easily caught (Irwin et al. 2004), perhaps by spearing. The data from site V14/188, therefore, suggest year-round fishing.

Fish were certainly plentiful in the nineteenth century. Matheson (1991) records that about 1903 James Cowan was informed by an old resident that kahawai were abundant just offshore, and that canoe-loads were once obtained by trolling with paua shell hooks. And in 1874 a huge net ¾ mile long was used to catch an estimated 3000-4000, or about 10 tons, of fish (Matheson 1991:

65). The species caught included stingray, dogfish, shark, John Dory, snapper, kahawai, yellowtail, gurnard and herring.

Monitoring of the water main replacement at Maketu has shown that there may be (or were) considerably more Archaic sites along the Bay of Plenty coast than presently recorded, and that some might be completely concealed by twentieth century development or reclamations. This project has also indicated a need for more research into the impact of the Kaharoa Tephra in the central Bay of Plenty and the effect that it had on the flora and fauna, particularly moa, and whether they were able to re-inhabit the region shortly after the eruption.

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